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Typed Name: Kevin D. McCarthy

Date: February 26, 2009

Patent 0-06-112 - 16290/US/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Bar-Yaakov et al.
Serial no.: 10/580,661
I.A. Filed: December 2, 2004
Title: FLAME RETARDANT ADDITIVE OF FLUOROPOLYMERS
IN FLAME RETARDANTS
Examiner: Nicole M. Buie
Art Unit: 1796
Confirmation: 5008

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

Amendment and Response

This response is in reply to the office action mailed on February 4, 2009.

Amendments

1. Please amend claims as shown on the attached pages. The amendments should distinguish the instant invention from the prior art techniques.

Denoting the composition of claim 1 as "fluoropolymer concentrate" is supported, for example, on pages 6 and 21 of the original specification.

In order to simplify and expedite the examination process, claim 1 has now been restricted to the retardants of original claims 5, which has been canceled.

The language of claim 1 has been amended to make clear, even to one not skilled in art, that the mentioned suspension involves both the fluoropolymer and the flame retardant.

Claims 5 and 26 have been canceled. Formal amendments have been affected in claims 11 and 27.

Claims Rejection – 35 USC § 102

2. Claims 1-4, 7, 11, 25-28, 30, and 31 are rejected as being anticipated by Yamamoto et al. (JP 049324093). The Applicant respectfully traverses the Examiner's novelty rejections for the following reasons.

3. The instant technology, particularly as defined in the amended claims, differs from Yamamoto's technique as described in the English machine translation of the above publication.

The production of flame retarded thermoplastic resins requires adding anti-dripping PTFE compositions (penultimate line on page 1 of the instant Original Specification (OS)); the drawbacks of prior art PTFE compositions comprise difficulties in uniform dispersing PTFE into thermoplastic resins (line 16 on page 5 of OS), and tendency of powdered PTFE to segregate from dry blended mixtures (line 6 on page 6 of OS). It is known in the field that, particularly during mixing and extruding the thermoplastic mixtures, PTFE tends to form a separate phase; this problem intensively radiates from the Yamamoto's specification, especially from paragraphs 0003-0005, which relate to adhering of PTFE to the equipment.

Yamamoto describes a PTFE composition intended to address the above issues of uniform dispersion (lines 5-6 of par. 0005 of the English Translation (ET)) and tendency to segregate and stick to the reactor walls (line 5 of par. 0003 of ET). Yamamoto's composition comprises (A) PTFE, and (B) a component selected from auxiliary Flame Retardant (FR), thermostabilizer, and release agent (see claims, abstract, and par. 0008), wherein the PTFE acts as a binder in the mixture. Said auxiliary FR is preferably inorganic antimony trioxide, but can also be an organic phenol or cresol derivative (par. 0012 of ET). The two components, A and B, are cold-pressed in a granulating machine, the PTFE particles (A) acting as a glue in binding the B particles, said particles A and B together forming 2.5-3.2 mm pellets (par. 0020).

The instant invention provides a totally different solution of the above problems. The PTFE particles are buried inside another material and, therefore, no problems arise due to exposed sticky PTFE material. The instant specification clearly describes trapping the PTFE inside molten material (line 5 on page 13 of OS), essentially resulting in coating PTFE particles with a non-sticking material (line 10 on page 8). The invention, however, is not limited to solving the above problems by enveloping the sticky PTFE anti-dripping agent by any non-sticky material (which would by itself represent a novel technique) – in addition it was surprisingly found that the role of said non-sticky isolator can be assumed by a flame retardant selected from organic brominated or phosphorus compounds. Thus, a novel additive for thermoplastic resins was provided – a composition simultaneously rendering to the resin anti-dripping and flame-retardant properties.

4. Structurally, Yamamoto's additive (anti-dripper to be added to a thermoplastic resin) is a mixture of two powders, PTFE and an additive ingredient, that are pressed and which stick together due to the binding properties of the PTFE; on the other hand, the instant additive is a dispersion of PTFE particles inside a continuous phase of a flame retardant.

Chemically, Yamamoto's additive comprises inorganic antimony oxide or organic phenol or cresol derivative; on the other hand, the instant additive comprises an organic brominated or phosphorus compound.

Functionally, Yamamoto's additive provides to a plastic resin either an auxiliary FR, or a thermostabilizer or a release agent; on the other hand, the instant additive provides a Flame Retardant.

5. In the PTFE additive composition, Yamamoto uses the PTFE as a binder, whereas the instant invention uses FR as a binder. Therefore, the instant additive better and more efficiently overcomes the problems of the prior art techniques (for example, the paragraph bridging pages 35-36). Although Yamamoto mitigates the sticking tendency of the PTFE by mixing it with particles of other materials, the solution is only partial because some PTFE particles still remain exposed to contact with outer environment. The instant invention entirely buries the PTFE particles inside enveloping continuum. As a result, the PTFE additive of the present invention enables excellent handling (line 6 on page 7, the last paragraph on page 32), and, furthermore, it very efficiently renders anti-dripping and flame retarding properties to the resins, with less bromine and antimony oxides than prior techniques (paragraph bridging pages 25-26), possibly working even without antimony synergist (line 4 on page 38). Whereas Yamamoto's additive is intended predominantly for ABS resin, the superior flame retarding properties of the instant additives (lines 6-7 on page 30) are confirmed for a broad range of resins (Examples, pages 10-11).

Not all the surprising aspects of the increased anti-dripping and flame-retarding properties by the instant concentrate are clear to the Applicants, but it is believed that the continuous phase formed by the FR around the PTFE particles assists in overcoming some of compatibility problems, which regularly occur during mixing when manufacturing the multi-component thermoplastic resins.

6. It is now believed that, in view of the above explanations, the Examiner will change her opinion about similarities between the instant technology and the Yamamoto's technique. On page 2 of her letter, the Examiner notes that

"Yamamoto et al. discloses a composition consisting essentially of a solidified fluoropolymer ("granular PTFE") in flame retardants (e.g. antimony trioxide, tetrabromobisphenol A) ([0020, [0021]], where ...the flame retardant distributes uniformly into resin [0007] (which implies the fluoropolymer is evenly dispersed in the flame retardants), absent objective to evidence to the contrary."

The Applicants respectfully comment on the above as follows:

- a) The Applicant has not located any passage in the Yamamoto's document relating to "solidified fluoropolymer in flame retardants".
- b) Tetrabromobisphenol A is mentioned only in paragraph 0021 (ES), which described the use of the PTFE additive, which is not a part of the instant claimed subject matter. Paragraph 0021, however, demonstrates

that flame retardants, such as tetrabromobisphenol A, are not a part of the Yamamoto's anti-dripping additive.

c) Paragraph 0007 (ET) relates to mixing the thermoplastic resin with components, mentioning uniform distribution of FR in the resin – it is evident that the sentence says nothing about the distribution of PTFE in FR, Yamamoto uses no FR in their PTFE additive, as explained in paragraph 0008 of the ET.

The Examiner's note (the first paragraph on page 3 of her letter) regarding the product by process is believed to be irrelevant, particularly after amending the claims, since the instant product is totally different from the Yamamoto's product, as hopefully clear from paragraph 4 above. The Examiner's note about instant claim 3 (the second paragraph on page 3 of her letter) results, thus, from a misunderstanding; there is no FR involved in the Yamamoto's PTFE additive – there may be only an auxiliary FR (antimony oxide), which is only a synergistic component requiring the presence of a real FR (such as a brominated organic compound). Nevertheless, whatever the component B in the Yamamoto's additive composition should be, the components A and B are powders (paragraphs 0009 and 0020 in ET) to be mixed (line 4 in par. 0020) and cold-pressed (lines 6-7 at par. 0020), utilizing the PTFE sticking-binding properties. No melting is used in the preparation of the Yamamoto's PTFE additive, therefore no continuous phase for burying PTFE particles can be created, still less a continuous phase of a FR, as no FR is present.

7. In addition to the above arguments, it is noted that the Examiner acknowledges claim 5 as novel; since the subject matter of original claim 5 is now incorporated into claim 1 – amended claim 1 is novel. Claims between 2-31 are also believed to be novel, since they depend from amended claim 1.

Claims Rejection – 35 USC § 103

8. Claims 5-6, 8-10, 12-13, 26, 27, and 29-31 are rejected as being unpatentable over Yamamoto. The Applicant respectfully traverses the Examiner's obviousness rejections for the following reasons.

9. Yamamoto is stated to disclose the composition of original claim 1 (page 4 of the Examiner's letter). It is believed that, after the above explanations, the Examiner will acknowledge the principal difference between the instant and Yamamoto's additives. The differences may be quickly corroborated by routine laboratory tests used in the art.

A quick microscope evaluation of the prior art additive will reveal two or more types of powder particles existing side by side in the mixture, whereas the instant material will comprise PTFE particles visible inside a continuous phase. A routine chemical analysis will immediately disclose a brominated or phosphorous organic components in the instant product, which are missing in the prior art additive.

10. The Examiner notes that brominated FR are disclosed in Yamamoto (page 4 of the letter); however, the FR are mentioned as routine additives to thermoplastic resins,

and not as a part of the PTFE ready-made additive (resin compositions are not presently claimed). The Examiner acknowledges the fact that Yamamoto absolutely does not relate to melting (last paragraph on page 4 of the letter), but she cites par. 0026 and 0027 (ET) as rendering the instant FR obvious; however, the Applicants, with all due respect, cannot find any evidence in the cited paragraphs, believing that said passages might be cited by mistake.

11. The Examiner's assumption A) (first paragraph on page 6) that the instant claims do not exclude other materials beside PTFE and FR seems to the Applicants irrelevant; even if other components are present in the PTFE concentrate of the invention, the novel features, namely the presence of flame retardants, and the existence of PTFE dispersion in a continuous phase, will distinguish the concentrate from the prior art additives.

The assumption B) is considered moot after the Applicants explanation that Yamamoto relates to the whole composition of thermoplastic resin, when mentioning FR. Clearly, Yamamoto teaches in cited paragraph 0012 that the PTFE additive comprises only "fire-resistant assistant" (the first word in par. 0012). As known in the field, other FR must be eventually added to the resin, but Yamamoto does not wish these component to be present in the PTFE additive, as they would not form a good two-powder granules under room-temperature pressing. Even if adding FR, Yamamoto's cold-pressed powders would not provide the above observed superior properties of the instant concentrates anyway, because they would lack said particle-in-continuum consistency (par. 5 above) of the instant concentrate.

The Examiner's assumption C) states that Yamamoto realizes the same product, even though he never uses melting in the preparation of their composition. This assumption is moot in view of the above paragraphs (e.g., 4 and 5). The Examiner suggests that Yamamoto implies that "fluoropolymer is evenly dispersed in the flame retardants", citing par. 0015, but that paragraph, mentioning also antibacterial medicine, hardly teaches anything close to the instant concentrates, and hardly would have inspired one skilled in art to make the instant concentrate.

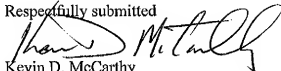
12. The Examiner suggests that it might have been obvious for one of ordinary skill in the art to add FR to the auxiliary FR. It would not have been obvious to add FR to the PTFE additive of Yamamoto, because Yamamoto teaches that PTFE sticking properties could be mitigated by mixing the PTFE particles with auxiliary FR, or with stabilizer and release agents at room temperature, while excluding other components usually included in the resin production.

Conclusion

13. It is believed that after the above explanations and amendments, the amended claims define a novel and non obvious PTFE concentrate. It has been shown that JP 049324093 does not teach a PTFE composition either containing FR or comprising PTFE particles dispersed inside particles of other components. As it is believed that all of the rejections set forth in the Office Action have been fully addressed, favorable reconsideration and allowance are earnestly solicited.

If the Applicants explanations are not found persuasive, the Examiner is respectfully requested to kindly grant to the Applicants an interview for clarifying the issues.

Respectfully submitted

A handwritten signature in black ink, appearing to read 'Kevin D. McCarthy', written over the typed name.

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